

AMD Projects

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CDC's Advanced Molecular Detection (AMD) initiative fosters scientific innovation to transform public health and protect people from disease threats.

AMD Projects: Silencing the 100-day Cough

Using AMD technologies to understand changes in virulence of *Bordetella pertussis* and find effective vaccine components and diagnostic markers

Thought to be a disease of the past, whooping cough (pertussis) has returned with a vengeance. Following a low of about 1,000 cases reported in the 1970s, the disease reached a nearly 60-year high of about 48,000 cases reported in 2012. Known as the "100-day cough," pertussis can cause serious illness in people of all ages, but it is deadly for babies. The recent increase in this disease is likely because the newer and safer vaccine introduced in the 1990s does not provide high levels of long-lasting protection. The pertussis bacteria have also changed over time, and this also could be contributing to this unusual situation.

CDC has been working around the clock to understand what is driving the reemergence of pertussis. CDC's recent analysis showed that one vaccine antigen, pertactin, is now missing in at least 9 of 10 specimens collected in the United States. Pertactin, a protein, is one complete genome of historic and currently circulating strains of *Bordetella pertussis* to look at how well the vaccine protects against these bacteria when they are lacking pertactin and if these genetic changes are contributing to the reemergence of pertussis.

Getting to the bottom of the strain change question is critical to CDC's efforts to control pertussis in the United States. The answers will inform development of new pertussis vaccines and thereby help protect families from losing children to this illness.



CDC and the American Academy of Pediatrics (AAP) recommend that preteens get several vaccines at their 11- or 12-year old check-up, including the Tetanus-diphtheria-acellular pertussis vaccine (Tdap).

